# SRTP - Project Description Form #214

**PART I:**

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| **Name of Schulich faculty member who will supervise the project** | Kristin Clemens |
| **Supervisor's Schulich, Western, Hospital or Lawson Email** | kristin.clemens@sjhc.london.on.ca |
| **Schulich Department** | Medicine |

**PART II - Project Description**

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| **Title of Project** | HEart pRotection in Diabetes (HER-1) |

**Background**

Type 2 diabetes (DM2) can have a profound impact on the cardiovascular (CV) health of women. The presence of diabetes promotes a greater excess relative risk of coronary artery disease, stroke, heart failure and chronic kidney disease in women vs. men.

While differences in cardiovascular (CV) risk amongst women vs. men may be due to "unmodifiable" factors (e.g. biology) there are known "modifiable" disparities in CV risk factor management across sexes (biological) and genders (social construct). For example, while it is widely understood that control of hypertension, reduces CV outcomes, control of hypertension has declined in Canada, particularly in women. Although analyses have suggested that there can be a 14% reduction in myocardial infarction for every 1% reduction in hemoglobin A1c (HbA1c), in many areas of the world, women with DM2 continue to have higher HbA1c levels than men. Across populations, women with DM less often receive screening for albuminuria than men, despite having a heightened risk of nephropathy.

Furthermore, many DM2 medications continue to be underutilized in women. Sodium-glucose co-transporter 2 inhibitors (SGLT2i) have been proven to reduce CV (and renal) outcomes across clinical trials yet, there continue to be fewer prescriptions for SGLT2 inhibitors in women vs. men. Glucagon-like peptide 1 agonists (GLP-1RA, eg. semaglutide) can reduce CV events including stroke and help people with obesity and DM2 lose weight, yet observational analyses have noted fewer prescriptions for GLP-1RA in some sub-groups of women, compared with men. Women have not only been understudied RCTs in trials of cardioprotective medications in DM2 (comprise 30-40% of the sample size), but at baseline, they less often used beta-blockers, aspirin, and statins compared with men, despite having a higher prevalence of stroke, heart failure and CKD.

**Hypothesis**

To promote the CV health of women with DM2 we need much more research to "expose, understand, and address" disparities in women while recognizing the influence of sex and gender roles. The overall aim of this research program is to examine for, and address CV care gaps in women living with DM2 and CKD in Canada. We will advance the following specific objectives:

1. Examine changing trends in the monitoring, treatment, and control of CV risk factors in women with DM2 compared with men in Canada. Indicators of care with include the monitoring of kidney function, lipids, and blood glucose levels, and the use of antihypertensive, and lipid-lowering prescription medications (statins, angiotensin converting enzyme inhibitors/angiotensin receptor blockers, SGLT2 and GLP-1RA); [Quantitative study]
2. Identify contemporary "gaps" in the monitoring, treatment and control of CV risk factors in women with DM2 and CKD, and identify system- and individual-level factors that may be contributing to these gaps; [Quantitative study]
3. Work with women to explore the root causes of CV gaps and conceptualize care pathways that might promote more

equitable CV care.

We hypothesize that this work will lead to a historical understanding of care gaps in CV risk factor management in women with DM2. We expect that women with socioeconomic barriers may continue to be at heighted risk of suboptimal CV management.

**Proposed Methodology**

Design, setting and population: We will use secular trends methodology and linked administrative health data to examine historical trends in CV risk factor management in Canadian women vs men aged 40 years or older with DM2. We will include three diverse Canadian provinces in our analysis, Ontario (Canada's most populous province, central), Alberta, and Nova Scotia.

Data sources: We will leverage provincial administrative health data (ICES in Ontario) to capture demographics, comorbidities, socio-economic characteristics and laboratory data.

Outcome 1: We will examine the proportion of women and men with at least annual HbA1c, lipid and kidney function tests, as well as prescriptions rates for CV protective medications including statins, ACEi and angiotensin receptor blockers (ARB), SGLT2i, GLP-1 RA (per 1000 individuals). Ee will also examine for glycemic control (mean/median HbA1c) and LDL-C over time.

Outcome 2. In the most contemporary year of study, we will examine:
a. The percentage with no evidence of HbA1c, lipid testing or an electrocardiogram
b. The percentage with no evidence of a statin, ACE/ARB, SGLT2, or GLP-1RA prescription
c. The percentage with a mean annual HbA1c, with an HbA1c of >8.5% indicating "uncontrolled DM"
d. The percentage with a mean annual LDL-C >2.00 mmol/L
e. Measurable system- and individual-level predictors of care gaps (TBD)

Analysis: We will summarize the baseline characteristics descriptively. After quantifying the percentage with care gaps a-d, we will use a Donabedian framework, to examine the predictors of care gaps. Depending upon event rates these will include patient (age, sex, comorbidities), provider (years in practice), and health system factors (availability of family physician, visits to specialists) that can impact care quality. Analyses will be conducted using logistic regression and we will present odds ratios (OR) and associated p-values.

**Expected Outcomes**

The SRTP student will gain valuable skill in the conduct of administrative database studies including the creation of protocols, development of administrative coding algorithms, development of data analytic plans and the interpretation of results. They will also learn to work with multidisciplinary teams of researchers and patient partners and draft manuscripts and abstracts. Moreover their work will serve as the foundation for a large interventional study focused upon promoting health equity in people living with DM.

**Research Environment – Description of the number of research personnel, primary location of research, size of lab, etc**

Our multidisciplinary, international team of clinicians and scientists have expertise in nephrology, endocrinology, epidemiology, statistics, sex and gender research, health disparities and the patient experience. Our research will follow the principals of equity, diversity, inclusion and decolonization both in research practice, and design. The SRTP student will be meaningfully involved in all aspects of this work. They will meet with Dr. Clemens routinely, who provide them with hands-on support and supervision. The SRTP student will also be invited to attend Dr. Clemens' clinic as observers, to gain additional clinical insight to support this project.

**Names and titles of other individuals who will be involved with the research project?**

Salimah Shariff (Staff Scientist, ICES Western)
Louise Moist (Nephrologist, Western University)
Amanda Vinson (Transplant Nephrologist, Dalhousie University)
Padma Kaul (Epidemiologist, University of Alberta)

Sofia Ahmed (Nephrologist, University of Calgary)
Carina Hockham (Post Doctoral Research Associate, The George Institute of Global Health)
Mark Woodward (Statistician, The George Institute of Global Health)

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| **Can this project be done remotely?** | Yes |
| **Duration of Project** | Two Summers |

**Expected Objectives/Accomplishments for Student for Year 1?**
Upon the completion of Year 1, the student will have:
-Completed ICES training
-Completed literature review
-Completed Data Creation Plan (ICES) and analytic plan for Objectives 1 and 2

**Expected Objectives/Accomplishments for Student for Year 2?**
Upon the completion of Year 2, the student will have:
-Interpreted study results
-Completed draft of manuscript
-Written an abstract for presentation at a national/international meeting

**PART III - Certifications**

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| **If the project will require any certification approvals from one or more of the following offices, please check the appropriate box below.** | - Human Ethics |
| **Human Ethics: If you have the protocol information, please enter it below (or enter the status of the approval).** | ICES approvals only |

**Note: certification approval should be obtained prior to the start of the summer. Projects without this approval will not be a priority for funding.**